DOCUMENT RESUME

ED 366 291 IR 016 482

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TITLE College Students and Computers.
PUB DATE Apr 93
NOTE 10p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Literacy; *Computer Science Education; *Computer Software; Higher Education; Hypermedia; *Preservice Teacher Education; Undergraduate Students; Use Studies; *Word Processing

ABSTRACT

The study reported in this paper examined the computer competencies of 193 undergraduate students at East Carolina University (North Carolina). A 10-item questionnaire inquired about previous computer courses in both high school and college. About 50 percent of the students had taken a computer course or had worked with computers at home or on the job. The study found that: (1) students had studied all sorts of programs in their previous schooling but had forgotten most of them; (2) students learned programs such as WordPerfect and Microsoft Word out of school and continued to use them; (3) students had little familiarity with DOS or other operating systems; and (4) few students were familiar with multimedia applications. Three conclusions are based on these findings. First, high school and college students should start with word processing programs such as WordPerfect because inexpensive student versions of these programs are available. Second, Windows-like programs and others with icons and pull down menus are the favorites with students and mask the operating systems. There seems to be little need to teach programs such as DOS or BASIC. Third, students need opportunities to use their computer skills, or they soon lose them. The impact on teacher education of the implementation of a K-12 computer skills curriculum in North Carolina is also addressed. (KRN)

ED 366 291

COLLEGE STUDENTS AND COMPUTERS

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This study examined the computer competencies of 193 students in the upper division to determine their computer competencies. A ten item questionnaire inquired about previous computer courses in both high school and college. For example, "Have you taken a computer course in college? Please describe the course and programs." Overall about 50 percent of the students had taken a computer course in college or high school or had worked with computers at home or on the job. The findings of the study were: [1] The students had studied all sorts of programs in their previous schooling, but had forgotten most of it. For instance, Basic and DOS were widely taught and rapidly forgotten. [2] students learned up–scale programs such as **WP51** and **WORD** out of school and continued to use them. [3] Students had little familiarity with DOS or other operating systems. [4] Few students were familiar with multimedia applications. The main conclusions were: [1] High school and college students should start with up–scale word processing programs such as **WORD** and **WP51** and it was noted that inexpensive versions of these programs are available for students. [2] Windows–like programs and others with icons and pull down menus are the favorites with students and mask the operating systems. There seems to be little need of teaching programs such as DOS, BASIC or LOGO. [3] Students need opportunities to use their computer skills in other classes across the campus or they soon loose the skills. bb

COLLEGE STUDENTS AND COMPUTERS

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The North Carolina Department of Public Instruction has developed a list of computer competencies for all educators. By 1995, North Carolina 8th graders will be tested on their computer competencies. But what competencies do the students possess who are currently enrolled in teacher education programs – some of the ones who will be preparing 8th graders for these tests? What do they know about the use of technology in teaching? What training have they received, and what have they retained to use computers successfully? Have they been able to continue using the computer as a tool in the preparation of term papers? What do pre-service teachers perceive as the role of computers and technology in education?

To begin answering these questions the students in the instructional technology courses at East Carolina University were selected for a preliminary study. These students were first and second semester seniors who either were about to start their student teaching later in the semester or who would be doing so during the following semester. The survey was given to students entering EDUC 3271 Introduction to Educational Media, EDUC 3272 Introduction to Audiovisual Instruction — Materials and Techniques, or EDUC 3700 Technologies in Education. These basic media courses of 1, 2, and 3 credit hours respectively cover such aspects of media as instructional video, visual literacy, computers as educational and personal tools, and telecommunications. There was a 100 percent return on the 193 questionnaires, although not all questions were answered. Professors of the courses had noticed that many of the education students were not very familiar with educational technology a few years ago, but

thought that this number would decrease as computers became more plentiful and were being used in public schools. Informal assessment over the years indicated that students seemed just as unenlightened as ever when compared to students of five or so years ago. The investigators established a baseline with this formal, open–ended survey, and based on this survey, will develop it into a more objective measuring instrument to be used each semester. In this way, a broad series will be collected for longitudinal research.

The questionnaire was distributed to 193 students during the first class meeting in the spring of 1993. Many questions were open ended giving respondents opportunities to elaborate on their answers. A copy of the questionnaire is at the end of the paper. Only the questions pertaining to computers are considered in this paper. The first part of the analysis is an overview of the responses to selected questions. Most questions had several parts. For example, Question #1 asked students if they had taken a computer course in high school and then asked them to describe the course, the language, and the programs used. Question #3 was a general question about competencies. Table 1 provides a summary of the initial responses to several of the questions, while the extended responses are summarized in Table 2 and 3.

Almost half of the students reported having a computer course in either high school or college; however, almost one third indicated that they had worked with computers in other capacities. Very few indicated familiarity with terminology of instructional technology, with telecommunications, or with the use of multimedia.

Table 1

Summary of responses to survey

		YES		NO	
		no.	%	no.	%
1.	Did you have a computer course in high school?	79	41	105	59
2.	Have you have a computer course in college?	94	48	109	52
4.	Have you worked with computers in other capacities such as work?	118	61	72	39
5.	Have you had any experience with CD-ROM, CD-I or video disks?	10	05	183	95
6.	Have you had any experience with telecommunications?	8	04	185	96
10.	Are you familiar with the terminology of instructional technology such as DOS, CPU, CRT and others?	8	04	185	96
11.	Have you done any work with computers and multimedia?	15	07	178	93

Question #1 also asked those students who had taken a course in high school what type of computer, and programs they used. As is shown in Table 2 the most common was a course in BASIC with half as many courses dealing with word processing and data processing. The most common comment concerning the high school courses was that the students had totally forgotten what they had learned in these courses especially programming in BASIC. As with other learning, they forgot what was not used in subsequent courses. Their first couple of years of college required little or no computer use.

Table 2

Courses students had in high school

BASIC (Tandy, IBM or Apple)	36
Word Processing	17
Data Processing	14
Business/spreadsheets	5
Games	3
Pascal	3
COBOL	2
Graphics	2
Algebra	2

The responses to Questions #2 and #3 have been combined since they both address specific programs the students knew. Many students listed more than one course, program and/or computer platform. The vast majority lists some form of word processing. It is interesting to note that only 4 students listed BASIC as a programming language with which they were familiar, while 36 had taken a course in BASIC in high school.

Table 3

Programs and languages identified by students

Word Perfect	48
Windows/Word	25
Word Processing	13
Macwrite/Appleworks	10
Introduction to computer	7
Brothers Word Processor	5
BASIC	4
Macpaint	4
Lotus 1,2,3	4
COBOL	2
Data Processing	2
Draw/paint	2
MicroSoft Works	2
Excell	2
Anatomy	1
CAD	1
Commodore	1
Curriculum Works	1
Fortran	1
Framework	1
Fredwriter	1
Hypercard	1
Music Tutorial	1
Pagemaker	1
Pascal	1
PC Junior	1
Photoshop (PrintShop?)	1
Prodigy	1
Science	1
Wordstar	1
Writing assistant	1

Question #4 asked about computer use in the work place. Some students had operated an electronic cash register, used the scanners for checkouts in the super market, operated scanners for taking inventory, or held jobs that required word processing. The task identified most often was data entry which was done by 38 students. Word processing was reported by 10 students, and others mentioned miscellaneous uses such as checking out video tapes at the local video rental store.

In response to the question asking for how computers might be used in teaching, the answers ranged from "I would prefer not using computers because I feel it takes the place of the teacher" to "I believe computers will be everywhere." Many looked forward to the computer assisting them in their paper work including recording grades, writing exercises and tests, and generating IEPs. Others considered the use of the computers for drill and practice, tutorials, or reinforcement of material. The marketing and business education majors were conspicuous in their recognition of the fact that they will be teaching others to use computers. Art majors see the potential for the use of computers in design and graphics. Even before taking the course, several responded that the computer would help them serve those with special needs. Surprisingly, few saw a potential for improving student writing. One expressed a "fear that things like 'spell check' will make students rely on it instead of their minds." In summing up the responses, a student warned "I think these will be useful in the future only if teachers become much more educated about these areas."

OBSERVATIONS

1. The computer skills that the students learned in high school and early in college did not appear to carry over into their senior year of college. That is, when they learned to program in BASIC, to use data processing in high school, or to use a word processing program specifically designed to be used on one platform (e.g., Apple or Commodore) but did not continue to use these skills in college, and these skills were soon forgotten. Additionally, many of the programming skills learned in college such as BASIC, FORTRAN, or LOGO were not used again after the course, and that ability faded, too. The responses did not lend themselves to analyzing whether the concepts of word wrap, formatting, and editing were transferred to learning other word processing programs. The same is true for spreadsheets.

2. The most striking finding was that the students wanted to and did learn word processing skills on their own or on the job. Whether they did so because they were unable to take courses in high school or college or whether the courses they had taken did not meet their

needs was not determined. The students on their own or with the help of friends learned the basics of such programs as *Word Perfect* or *Microsoft Word*, but could not always name the program. Students had a tendency to overestimate their computer skills. For example, if they indicated that they knew how to use *Word Perfect*, they were unable to complete an exercise using the program. That is to say, authentic assessment (e.g., please do an activity in *Word Perfect*) did not support the estimated assessment gathered by the questionnaire.

3. Students had little or no familiarity with operating system commands found for example in DOS as newer programs mask the operating system. They knew and used a particular word processing program without regard to platform or computer configuration.

4. Few students were familiar with telecommunications, interactive television, or CD-ROM.

CONCLUSIONS

As previously stated, this study attempts to establish a base-line leading to further study of the educational technology knowledge of students in teacher education. The conclusions and recommendations are based on this preliminary data and will be used in the design of further research.

1. There seems to be little transfer from programs such as *PC-Write* to programs such as *Word for Windows*. More research is needed to determine if the use of programs such as *FrEdWriter*, *AppleWorks*, and *PC Write* has carryover value when college students are faced with campus-wide use of programs such as *Word*, *WordPerfect*, *Excell*, and *1-2-3*. It is recommended that high school students start with the latter programs, since inexpensive student versions of these programs are available.

2. Windows-like programs and others with pull down menus mask the operating system. There seems little need of teaching DOS, BASIC or LOGO since they are rapidly forgotten. These programs are "legacy" programs and their place is being taken by more advanced operating systems such as **OS/2, NT**, and the object oriented world languages.

3. Students need to be provided opportunities to continue applying their computer skills in college. From freshman composition classes through senior term papers, computer skills should be strengthened. An excellent example at East Carolina University is the use of word processing in the "Writing Across the Curriculum" program. Another example is in the library where the option to download information to disk is available at the periodical and newspaper index at CD-ROM workstations. The downloads are in the ASCII format and may be imported into many word processing programs.

IMPLICATIONS

The growing popularity of home computer use and membership in telecomputing services such as *Prodigy* and *CompuServe*, is pushing schools into expanding the use of telecomputing services designed for educational use. Schools need to include phone lines, monthly services, and searching fees in their instructional budgets to familiarize students with telecommunications.

The implementation of the Computer Skills Curriculum in the schools of North Carolina will impact not only the students in K-12, but should also have an effect on the use of computers as personal tools in teacher education programs. The researchers will continue to monitor the computer skills of teacher education students in the university's mission to prepare teachers for schools in North Carolina 2000.